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Water Scarcity Campaign Targets Egyptian Farmers

The camera follows a young boy as he joins his grandfather on a ridge above their village."Is it possible grandfather," he asks, "the Aswan Dam today is filled with water, and yet I look in your face and still see you are worried?" Grandfather quietly explains that Egyptian water is limited by treaty and will not increase in the future as the needs of the country increase. Again the boy asks, "So wise grandfather, what is the correct way to act?" As the scene changes to irrigation water trickling past growing crops with the water's path cleared by a helpful farmer's hand, the voice of the grandfather warns, "Don't let today's abundance fool you; misusing our water will reduce its usefulness. We have to protect the water like our eyes and think of the future."

This television public service announcement is one of six broadcast across rural Egypt to make farmers aware of the treaty that limits water in Egypt and their responsibility to conserve water resources. These spots are one portion of a campaign on water scarcity recently launched by the Water Communication Unit (WCU) of the Ministry of Public Works and Water Resources (MPWWR). Farmers use 86% of Egypt's water, and the degree to which water can be reused in Egypt is largely dependent upon their ability to prevent pollution.

The campaign was requested by the late Minister Radi of the MPWWR, a visionary leader who wished to transform farmers from being the "problem" to being the solution to water scarcity concerns. With assistance from USAID, MPWWR and WCU quickly geared up to develop a comprehensive campaign addressing the MPWWR field staff (8,000 engineers), farmers, and rural schools through mass media and training. Helpful practices that farmers already use, such as night irrigation, leveling fields, and growing crops that require less water, are highlighted in the spots to congratulate progressive farmers and encourage others to join these early adapters

The overall message of the campaign is, "Egypt has a limited supply of water and it is going to become more limited in the future."

Each message was pre-tested on male and female farmers to make sure it was clear and appropriate. This testing was essential and prompted changes in the messages between the initial design and the final product.

A sample of the communication materials prepared for the campaign.

The Water Communication Unit is looking forward to evaluating this campaign and extending their staff capabilities to work with communities and design campaigns on specific water conservation and pollution prevention practices. The staff are helping the Ministry conduct business in a new way, by listening to their customers and providing services that customers want and need.

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Recognizing Gender…

The research that produced this Water Scarcity Awareness Campaign was careful to include gender analysis. This means that information was collected from both men and women farmers in a way that encouraged high quality data. For example, most focus groups were composed of only one sex, and half of these groups were female. In other groups, married couples were represented to assess agreement. The moderator and notetakers were the same sex as the participants in the single-gender focus groups. If a culture has a habit of quieting one gender in the presence of another, this simple practice of single-gender groups helps support the sharing of ideas and voices. From these voices a campaign can be sure to represent the full variety of perspectives. In the case of this campaign, researchers learned that women farmers were less likely to irrigate at night because of safety concerns and that education and family income were important predictors of women's contribution to farm labor.

Consider This in *Your* EE&C Program

Education and communication efforts to change behaviors often rely upon self reported behaviors to monitor the project. This technique often raises questions of reliability: How accurate are self-reports of environmental behaviors?

A water conservation campaign conducted in New Hampshire, USA, helped to answer that question. This was achieved by comparing self-reported responses to municipal water use records. Community residents responded to this survey question, "Comparing last summer (1981) with the summer before that (1980), do you think your household's water use increased, decreased, or stayed the same?" Unfortunately, only 42% of the respondents reported their water use correctly. Increases in use were dramatically underreported (as one would assume), and the response "stayed the same" was used by almost twice as many people as should.

Actual decreases in use, however, were slightly underreported. The "don't know" response was used, but not frequently.

Those who were accurate in their self-reports tended to have a higher socio-economic level (as measured by occupation, education, & income) and be actively engage in water conserving behaviors. Their activity probably increased their awareness and knowledge of their water use.

Poorer, elderly, and less educated respondents are more likely to respond with "don't know" or "stayed the same." They appear to be less aware and less knowledgeable than those with higher levels of income and lower age. Informational feedback about the results of water conservation activities might make an important difference in households that are not aware of their water use.

From: Hamilton, L. 1985 *Self-reported and actual savings in a water conservation campaign*, **Environment and Behavior**, 17(3):315-326.

***Human Nature* looks at ways that environmental education and communication (EE&C) affect the people who affect the earth. We hope to share innovative, practical ideas from around the world, link resources with those who can use them, and consider the education and communication implications of larger political, scientific, social, and cultural events.**

Recalling Past Lessons

Conserving behavior has long been considered by environmental psychologists to be of fundamental concern for any society intent on thriving in an uncertain and risky world. The water and other resources people depend upon are finite and their availability varies from season to season and from year to year. Careless use of these resources threatens one's well-being and ultimately, one's very existence. Since survival depended on the careful stewardship of finite resources, people learned to recognize the sorts of lifestyle patterns where such stewardship was both possible and supported. Recent research now suggests that modern-day people not only recognize such patterns but also find them personally satisfying to pursue. Rather than equating conservation with sacrifice (and hence demanding compensation for such extraordinary behavior) people are easily able to associate intrinsic satisfaction with a reduced consumption lifestyle. Thus the conserving lifestyle essential to survival long ago is not without its bright points—far from being a great personal sacrifice, living lightly on the earth might actually increase our personal quality of life and sense of well-being.

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History Repeats Itself

By Mary Sebold

As the world population grows and urban settlements spread, fresh water becomes a precious commodity. People everywhere are faced with water shortages due to weather patterns, contamination, or broken distribution systems that necessitate stronger water conservation measures. In Bogota, Colombia, for example, residents were recently asked to cut water usage by at least 20% as the city engineers repaired a faulty aqueduct.

Water shortages are certainly not new to arid lands, particularly those where human settlements have flourished for thousands of years. Some of the water conservation practices of ancient North Africa and the Middle East might provide insight and wisdom that could benefit water users around the world. It is clear from the archaelogical evidence that the Arabs, Persians, Berbers, Turks, Greeks, and Romans established efficient and healthy ways to harness scarce water resources for municipal and agricultural uses.

Collecting and storing every drop of rainwater was important to these ancient people. Covered or bottle-necked cisterns and underground vaults were used to prevent evaporation and reduce contamination of stored water. Water from fountains or irrigation was sometimes reused; other waste water was carried outside the city walls. The Romans tested water quality and added substances to cleanse polluted water or diverted water to flush the poisons. Later, the Muslims developed a hierarchy for use of reservoirs and springs designating certain sections for potable water and others for washing.

Archaeological clues from several ancient cities provide a sense of the engineering and prominence water must have held in these cultures. The ancient city of Carthage was built by the Phoenicians sailing from modern-day Lebanon and Syria. Relying on rainwater rather than groundwater, each house stored water collected from their rooftops in underground cisterns. In 146 BCE, the Romans conquered Carthage and built an aqueduct that brought water from the modern city of Zaghouan, in the south. Water flowed by gravity through 132 kilometers of covered stone channels supported by huge, arched columns. The aqueduct terminated at La Malga, a reservoir system of approximately 25 long, covered, above-ground cisterns. Wells on top of the cisterns allowed public access . When cisterns were full, the aqueduct was closed so water could percolate into the ground below the cisterns. The Arab Hafsids restored the aqueduct in the seventh century and diverted it to Tunis, modern Tunisia's capital city.

In the eastern part of the Arab world, Jordan was also a home to the Romans. Channels cut into bedrock tapped the water table in Abila and Gadara. The force of the water, plus gravity, conveyed it as far as five kilometers. Shafts enabled maintenance, access, and natural replenishment. A third city, Capitolias, was built on a bedrock outcrop. At the highest point, cuts in the bedrock formed an intricate pattern of rain run-off channels that emptied into large cisterns. The cisterns were originally pockets chiseled out of bedrock. Three internal buttressing arches suggest that the Arab `Abbasids refurbished the entire system, adding a reservoir and an aqueduct. Later, in the Mamluk period and in Ottoman times, the cisterns were subdivided by plastered stone walls. The large number of pottery water jar fragments indicate that citizens probably collected their water from a central locale rather than from a system of pipes.

Despite the different inhabitants over the years, many of the water issues remain the same. Limited amounts of freshwater need to be protected and stored; waste water must be recycled. Water is indeed a gift of life, a holy commodity, whether from Zeus or the god of Abraham.

Mary Sebold is a specialist in Middle East public health and environmental issues at the Academy for Educational Development, Washington D.C.

THE Nature OF Things

- The establishment of the Arvoredo Coast Biological Reserve in South Brazil in 1992 created conflicts between those promoting use (particularly fishermen and divers) and those encouraging protection. After one year of research to understand the conflict, including meetings with seven different sectors, interviews, and surveys, communication and education programs have been designed to help resolve the issues. This baseline measure of knowledge, awareness, and behavior is a very important tool for measuring program effectiveness in the future. Some of the most powerful programs have used teachers to reach 10,000 students. Photography exhibits, videos, radio programs, posters, and curriculum materials have also been used to raise awareness and help residents and visitors understand the value of protecting the reserve.

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- ***The Daugava Tells Me a Story*** is a joint project of the Daugava Museum, Institute of Biology of Academy of Science, and Children's Environmental School in Latvia. The Project uses the Daugava, the largest river in Latvia, to help raise students' awareness about their environment. Students research the riverbanks, water, woodlands, and cultural history near their homes, learn research and project development methods, and develop a range of practical projects proposing solutions to issues they identify. Throughout the process, teachers learn how to use project work in the classroom. The success of the project has been involving whole schools in caring for the environment and developing links with local communities.

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- Even the people in Galicia Spain, the "land of a thousand rivers," must guard against destructive and wasteful practices to protect the quality of their apparently limitless water. Two agencies, the Institute Xelmírez I and the Institute de Sar are designing a joint study of Santiago de Compostela's rivers: the Sar and the Sarela. The study will explore the natural and cultural values of the rivers, increase interest of the local residents in their care and conservation, denounce harmful impacts on the rivers, and bring about protection and restoration activities. The Project will create a complete unit of study of water resources at the school and establish a permanent network to monitor the environmental quality of these rivers. The activities include organized tours along the river banks; laboratory studies of relevant parameters of water quality; visits to the water purification facility; video and photgraphic reports; and research on household water consumption, conservation, and contamination.

For more information, contact Manual Antonio Fernández Domínguez; I.B. Xelmírez I; Taller de Educación Ambiental; Campus Universitario; 15705 Santiago; Spain
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Water Monitoring Brings Change to Schools and Rivers

South Africa The Schools Water Project (SWAP) is an example of a GREEN (see box below) watershed education initiative which investigates and interprets river water quality as an indicator of environmental risk. SWAP also plays a role in the development of environmental education in South Africa by representing a non-structured, critical, and reflective orientation to educational and social change. This approach is in stark contrast to the traditional and general perception that the world of school is totally divorced from the everyday world.

SWAP makes water quality understandable to pupils. A locally-produced test kit is the primary tool of the SWAP project. Workbooks, laboratory guides and background literature developed in collaboration with teachers and fresh water ecology experts supplement the experience of periodic water quality monitoring and data collection along a nearby river. Through these investigations, the river becomes a source of knowledge which reflects the history, socio-economic conditions, and impact of human activities in the watershed. Students even have an opportunity to serve on a River Interest Group with scientists, conservationists, and government representatives, where they are encouraged to contribute ideas regarding river management.

The focus of SWAP has stimulated pupils and teachers to engage in a process of curriculum development in close collaboration with schools, local authorities, and other community organizations. Student data collection is organized with the full support of the municipality. Local authorities use the student investigations to supplement their own data.

Tensions have developed, however. A continued commitment to the project is often promoted by a small, enthusiastic group of students. Teachers may prefer to avoid the water monitoring program in favor of curriculum designed to achieve high examination scores. Nevertheless, local and national press has stimulated a healthy interest from parents and community groups that can encourage teacher participation. Although the improvement of rivers is a possible outcome of SWAP, the real value is in an emerging understanding of the complexities of education for social change.

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Environmental Education in the Lake Valencia Watershed

By Alejandro Luy, Regional Project Director, Fundación Tierra Viva (Live Earth Foundation)

Venezuela The Lake Valencia watershed covers nearly 1/3 of Venezuela in the center of the country, about 80 kilometers from Caracas. Ten percent of the nation's population and 30% of secondary industrial activities are concentrated in the 3,140 km^2 watershed which is governed by two states and 18 municipalities. The lake (340 km^2) is enclosed; no river leaves the lake carrying water to the sea.

The high concentration of industry and people are the principal causes of environmental problems in the region: management and disposal of solid waste, water quality and quantity, and deforestation.

In 1993, Fundación Tierra Viva initiated the Environmental Education Project for the Lake Valencia watershed to develop actions to raise the awareness of communities and schools about the local environmental conditions and to promote community and school-based actions to improve and conserve their environment. A special program was dedicated to capacity building or training for teachers and NGO members to develop team-led participatory environmental projects.

The capacity-building process extended over a 7 month period and included:

- A training workshop offering information about the natural resources and environmental problems of the region.
- Four follow-up workshops on designing, executing, and evaluating environmental projects.
- Follow-up assistance to evaluate the progress of participants, effectiveness of training, and design opportunities for additional environmental work.

In general, the success of this program depended on:

1. Strengthening the skills of participants and giving them the necessary tools through training.
2. Exchanging experiences and recommendations and debating the environmental impacts of Lake Valencia watershed projects.
3. Recognizing the participants through an accreditation strategy, on behalf of the National Experimental University of Simón Rodriguez through the Center for Experimentation for Permanent Learning (CEPAP).

Between September 1994 and July 1996, three cycles of the Fundación Tierra Viva program were completed with 390 individuals. The program promoted and assisted in the completion of 116 environmental projects, which included 120 schools and 14 NGOs. These projects, involved over 49,000 teachers, students, and community members from 13 cities.

The projects tackled a variety of environmental problems specific to each school or community. Some of the projects focused on recycling, school landscaping, restoring green areas, determining environmental impacts, repairing school infrastructure, establishing environmental libraries, etc.

According to an evaluation conducted by the Center for Cultural and Educational Studies, the school projects developed "the constitution of work teams "which "consisted not only of teachers and students, but also the educational community" and this practice "can initiate a new way to relate to the community, where the community can adopt a more active role in school decisions."

Years after the last training, many participants have continued their projects, adapting the objectives and the goals according to the lessons learned from previous experiences. This continuation demonstrates that the tools supplied by this project, "Training in Management of Environmental Education Projects," facilitated community and school-based environmental education and helped create a holistic vision of the environmental challenges faced in the Lake Valencia watershed.

The "Training Program in Management of Environmental Education Projects" has been financed by the European Union (1993-1995) and the Polar Foundation (1996), and has relied on the support of the Lake Valencia watershed agency of the Ministry of Environment, the National Experimental University of Simón Rodriguez, and the secretariats of the Ministry of Education for the Aragua and Carabobo states.

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GREEN (Global Rivers Environmental Education Network) is an international network of people and institutions which work to actively improve and sustain the planet's water system. Using water as a unifying theme, GREEN promotes attitudes, policies, and practices which encourage active participation by linking people at all levels through education and global communication. Programs are developed to foster environmental ethics, cross cultural sensitivity, and respect, thus contributing to a more trusting and peaceful world.

GREEN provides an innovative, action-oriented approach to education based around a watershed or catchment. By assisting teachers and students with monitoring water quality, studying land use patterns, exchanging information about their portion of the river with others, and developing action plans to improve local environmental quality, GREEN provides an important resource to schools and communities around the world. GREEN works closely with educational and environmental organizations in more than 130 countries to support local efforts in watershed education and sustainability.

G R E E N
Global Rivers Environmental Education Network

Key to the GREEN process is creating a learning community of teachers, students, parents, community groups, government agencies, nongovernmental organizations, and businesses whose members share a vision for watershed sustainability and possess the skills, knowledge and motivation to create change. The program is sustained through a network of regional coordinators pioneering a partnership between education and environment.

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Resources

Directory of Higher Education Environmental Programs

The Committee for the National Institute for the Environment in the United States announces a new World Wide Web database of undergraduate and graduate programs representing a broad variety of environmental disciplines. The Directory of Higher Education Environmental Programs (DHEEP) can be accessed through <www.cnie.org>. It allows prospective students to search for certain program characteristics and then obtain detailed information on each program. As more programs submit their information, the directory will become a clearinghouse for programs, faculty, and students. New programs can be added by submitting information directly at <www.cnie.org>. An additional database for international programs is under construction.

For more information contact Alison Lee; CNIE; 1725 K Street, NW, Suite 212; Washington DC 20006-1401; USA
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Environmental Education Workbooks in Spain

Since 1988, a group of educators and environmental professionals have gathered to conduct a variety of activities within the Institute of Science Education of the University of Santiago de Compostela. The group, known as the Environmental Education Workshop, has developed a collection of 16 booklets on environmental themes. The objective of the booklets is to help professors in the study, understanding, and transformation of the environment. Some titles include: Urban Solid Waste, Pollution of Continental Waters, The City, Food and Nutrition, etc. The publication of these booklets helps the Workshop meet its overall goal: to introduce environmental themes into the mass communication media, the agendas of local government administrators, and the school curricula of institutes and universities.

For more information contact Manuel Antonio Fernández Domínguez; ICE Universidad de Santiago; Taller de Educación Ambiental; Plaza Mazarelos, 15703 Santiago; Spain

Children's Participation

Young people around the world are enthusiastically involved in environmental issues. In a new UNICEF manual, *Children's Participation: The Theory and Practice of Involving Young Citizens in Community Development and Environmental Care*, Roger Hart (1997) writes that all children can play a central role in solving environmental problems. The key is that children's participation must be taken seriously; they should be involved in defining the problems and have a voice in forming solutions. Using case studies from urban and rural communities in both the developed and developing worlds, this book is an excellent guide to the theory and practice of children's participation. It introduces the organizing principles, successful models, and practical techniques for involving young people in environmental projects.

Published by Earthscan Publications Ltd.; 120 Pentonville Road; London N1 9JN; England
Email: <earthinfo@earthscan.co.uk>
Web site: <http://www.earthscan.co.uk>

Conference on Communications and Environment

Every two years the common focus of communication while addressing environmental issues brings together a diverse group of professionals, academics, and agency people to share research and experiences. Keynote presentations, panels, papers, and field trips stimulate participants to think broadly, focus narrowly, and explore the cutting edges of the field. Discussions often include: environment and culture, risk communication, environment and mass media, stakeholders and communication, and case studies.

Proceedings from the 1995 conference are now available from David Sachsman; 210 Frist Hall; University of Tennessee at Chattanooga; Chattanooga TN 37403; USA
Email: <david-sachsman@utc.edu>

Information about the current conference proceedings and next conference (Arizona in 1999) can be obtained from Susan Seneca at the State University of New York; College of Environmental Science and Forestry; 1 Forestry Drive; Syracuse NY 13210; USA
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The World Water and Climate Atlas for Agriculture

Scientists from the International Irrigation Management Institute (IIMI) and Utah State University have created a new global database called "The World Water and Climate Atlas for Agriculture" that will serve as a high-tech tool for farmers, agronomists, engineers, conservationists, meteorologists, students, and government policymakers. The Atlas integrates available agricultural climate data into one computer program and will be available on the Internet.

The Atlas enables users to zoom in on any 2.5 square kilometer region of the globe and extract critical data such as monthly and annual summaries of average, maximum, and minimum temperatures; precipitation; or evapotranspiration. All of these data are converted into maps that clearly delineate climatic conditions in a user-friendly computer program.

For more information about IIMI contact their Website at: <http://atlas.usu.edu>.

International Case Studies on Watershed Education

GREEN, the Global Rivers Environmental Education Network, has produced a compilation of programs from around the world that use rivers and water quality to involve students in their education. Cases include information about how to start such a program, organize a national strategy for watershed education (with examples from Australia, Bangladesh, Russia, and USA), design a program to meet cross-cultural objectives (Israel, Canada, Taiwan, Hawaii), build school-community partnerships (Scotland, Hungary, Australia, USA, Zambia), include problem solving and action taking skills (Australia, South Africa, USA), network with computers, student conferences, and newsletters (Australia, USA, Ecuador, Denmark, Canada), and involve schools from across the watershed (Pakistan, USA, Kenya, Italy, Hungary, Australia, Mexico).

The book, edited by William Stapp, Arjen Wals, Michele Moss, and Joanne Goodwin is available through Kendall-Hunt Publishing Company; 4050 Westmark Drive; Dubuque Iowa 52002; USA.

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